

# Limited Usage of Freshwater Crayfishes (genus *Euastacus*) by Aborigines in Eastern New South Wales: Records and Comments

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Australian Aborigines utilised freshwater crayfishes as food in many areas and these macro-invertebrates had substantial cultural significance. To investigate the extent of this fishery in eastern New South Wales, where Aboriginal populations are thought to have concentrated, literature and database surveys of contents of selected Holocene Aboriginal sites have been undertaken; but few remains of *Euastacus* species, known to be abundant in this region, are recorded.

In the light of recent scientific studies of *Euastacus*, the possible local impacts of harvesting on these crays are outlined and the paucity of remains at Aboriginal sites is considered to be due to: inadequate sampling or sorting of existing collections; poor preservation conditions; dispersal or destruction by scavengers; very low utilisation and correspondingly few recognisable remnants.

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## INTRODUCTION

Australian Aborigines are known to have utilised large numbers of animal species as food (Isaacs 1987). Crayfishes are one of the largest groups of edible macro-invertebrates in inland areas and the Australian crayfish fauna is very diverse (Merrick 1993). Crayfishes were harvested in many areas and described as a favoured food as well as a staple of the diet in some regions (Horwitz and Knott 1995; Isaacs 1987); however, there is relatively little information about harvesting techniques. General comments about collection of crays include observations of digging from burrows around ponds or swamps (Campbell 1978), as well as catching by hand from under large stones in rivers when levels were low (Flood 1980); but more specialised trapping methods (woven baskets with baits, sections of hollow logs) were also used (Horwitz and Knott 1995). Crayfishes (or yabbies) also had cultural importance. For example, there were yabby totems, places named after yabbies and crayfish 'ancestors'; a yabby clan is also reported to have lived in the Mt. Gambier–Grampian Range area (Horwitz and Knott 1995).

Although Aborigines utilised crayfishes as a food source over wide areas of New South Wales (Horwitz and Knott 1995; Versteegen and Lawler 1997), no systematic archaeological studies have been undertaken to assess the extent of this fishery. It is also clear that a large majority of the crayfish species in N.S.W. are restricted to the highlands or eastern coastal plain (Fig. 1) and some species have small total ranges (Merrick 1993; Morgan 1997). The only reports relating specifically to *Euastacus* in eastern New South Wales are: *E. armatus* being caught in the evenings in the Murrumbidgee, Yass and



Figure 1. Natural ranges of 24 *Euastacus* species in eastern New South Wales over the region for which collection records have been examined. A further six crayfish species of two other genera are also present in this region. Based on Merrick (1995) and Morgan (1997).

Tumut Rivers; small crays (almost certainly *Euastacus*) being found in the highest permanent streams of the southern highlands around Mount Kosciusko (Flood 1980). Another species, *Euastacus sulcatus*, which occurs in north-eastern New South Wales has been recorded at an Aboriginal site in south-eastern Queensland (Hall 1986).

In view of this faunal concentration adjacent to areas where Aboriginal populations are claimed to have undergone substantial intensification for several thousand years (Lourandos and Ross 1994), these studies were initiated to ascertain the level of utilisation of selected *Euastacus* species by means of faunal analysis. To date faunal analyses, in this area, have focused on vertebrate remains — especially the larger, more robust components (Godfree 1995; Owen and Merrick 1994a, b).

## MATERIALS AND METHODS

The NSW National Parks and Wildlife Aboriginal Sites Register was searched to determine if crayfish remains were widely reported from archaeological contexts. The regions specified in the computer search were based on the known distribution of *Euastacus* in eastern New South Wales, and focused on two broad regions — the N.S.W. south coast from Wollongong to the Victorian border, and the north coast from the Hunter Valley to the Queensland border (see Fig. 1). The search excluded sites immediately adjacent to the coast, but included all open campsites, shelters with deposit, and middens, extending from the estuaries inland for approximately 200 km. The specified range included some *Euastacus* habitats associated with limestone, such as the Stroud and Dungog districts and west of Wauchope in the north as well as headwaters of the Shoalhaven and Moruya Rivers in the south. Following up on selected Site Register data 23 unpublished excavation reports were examined to see if crayfish remains were recorded in the faunal species lists.

## RESULTS AND DISCUSSION

Of over 1,500 site records examined in this survey, in no case was there a clear indication that freshwater crayfish remains were present. There were some references to 'possible fragments of lobster shell' and 'crustacean shell, possibly lobster'; however, these were at sites close to the coast suggesting that the remains were probably those of marine crustaceans. The lack of crayfish remains is puzzling as this group of macro-invertebrates is the most abundant in many of the coastal aquatic systems, from middle reaches to headwaters, and larger species have robust skeletal components. Several aspects of this situation warrant further comment.

Firstly, it was considered that preservation conditions in many of these areas may not be good due to light, acidic soils and consistently wet conditions in upland valleys; however, investigations of collections made in limestone areas (e.g. Armidale, Jenolan areas) have not yielded any further data. Other researchers also report a low incidence of crustacean remains at coastal sites (Attenbrow 1995, pers. comm.). In south-eastern Queensland the only recognisable crustacean remains at coastal sites, excavated to date, are the chelae (claws) of crabs (Robins 1996, pers. comm.); however, the chelae of the larger *Euastacus* would be equally robust and so could be expected to remain relatively intact.

Secondly, the data now available about the biology of several larger *Euastacus* species (Honan and Mitchell 1995; Turvey and Merrick 1997a,b,c,d) indicate that these crays have life cycle strategies based on: slow growth and late maturation at a large size; low fecundity with annual (or less frequent) breeding; low adult mortality and individual longevity. When these features are considered, in conjunction with a territorial nature



and small home ranges, it is clear that local *Euastacus* populations could be quite effectively controlled (in terms of numbers of adults and breeding potential) by minimal culling (Barker 1990).

Thirdly, even though the evidence suggests that highland areas were not as intensively populated or occupied as lower coastal areas, they were visited and used as transit routes (Bowdler 1981). Furthermore, native predators or scavengers would disturb remains of Aboriginal harvests. Dingoes or water rats would destroy remains, or render them unrecognisable, by chewing; whereas goannas, would disperse or destroy remains when digging for food (King and Green 1993).

In summary, it is suggested that the paucity of crayfish in eastern Aboriginal sites is due to a combination of the following factors:

- (a) inadequate or incomplete sorting of existing collections;
- (b) archaeological sampling in areas where, coincidentally, few crayfishes were harvested;
- (c) poor preservation of crustacean remains due to unsuitable physicochemical conditions;
- (d) destruction and dismemberment of freshly discarded carcasses by native scavengers;
- (e) a low level of utilisation of eastern crayfish populations (resulting in a very low incidence of recognisable remains being preserved).

Any conclusion relating to the level of Aboriginal exploitation of this dominant, edible, macro-invertebrate group is impossible, pending analyses of investigations of additional archaeological sites. In addition to robust pieces of chelae the other elements that are most likely to persist are gastric mill ossicles and the gastroliths.

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### REFERENCES

- Barker, J. (1990). Spiny freshwater crayfish management strategy. *Fisheries Management Report* (34), 1–17. Department of Conservation & Environment, Melbourne.
- Bowdler, S. (1981). Hunters in the highlands: Aboriginal adaptations in the Eastern Australian Uplands. *Archaeology in Oceania* 16(2), 99–111.
- Campbell, I.C. (1978). Settlers and Aborigines: the pattern of contact on the New England Tableland 1832–1860. In 'Records of times past' (Ed. I. McBryde), pp 5–16. (Australian Institute of Aboriginal Studies, Canberra).
- Flood, J. (1980). 'The moth hunters. Aboriginal prehistory of the Australian Alps'. (Australian Institute of Aboriginal Studies, Canberra).
- Godfree, R. (1995). Analysis of vertebrate bone remains from an aboriginal shell midden located at Kurnell, N.S.W. B.Sc. (Hons) thesis, Macquarie University.
- Hall, J. (1986). Exploratory excavation of Bushrangers Cave (Site LA:A11), a 6000-year-old campsite in south-east Queensland: preliminary results. *Australian Archaeology* 22, 86–103.
- Honan, J.A. and Mitchell, B.D. (1995). Catch characteristics of the large freshwater crayfish, *Euastacus bispinosus* Clark (Decapoda: Parastacidae), and implications for management. *Freshwater Crayfish* 10, 57–69.
- Horwitz, P. and Knott, B. (1995). The distribution and spread of the yabby *Cherax destructor* complex in Australia: speculations, hypotheses and the need for research. *Freshwater Crayfish* 10, 81–91.
- Isaacs, J. (1987). 'Bush food. Aboriginal food and herbal medicine'. (Ure Smith Press, Sydney).
- King, D. and Green, B. (1993). 'Goanna. The biology of varanid lizards'. (New South Wales University Press, Sydney).
- Lourandos, H. and Ross, A. (1994). The great 'intensification debate': its history and place in Australian archaeology. *Australian Archaeology* (39), 54–63.

- Merrick, J.R. (1993). 'Freshwater crayfishes of New South Wales'. (Linnean Society of New South Wales, Sydney).
- Merrick, J.R. (1995). Diversity, distribution and conservation of freshwater crayfishes in the eastern highlands of New South Wales. *Proceedings of the Linnean Society of New South Wales* **115**, 247–258.
- Morgan, G.J. (1997). Freshwater crayfish of the genus *Euastacus* Clark (Decapoda: Parastacidae) from New South Wales, with a key to all species of the genus. *Records of the Australian Museum, Supplement* (23), 1–110.
- Owen, J.F. and Merrick, J.R. (1994a). Analysis of coastal middens in south-eastern Australia: sizing of fish remains in Holocene deposits. *Journal of Archaeological Science* **21**, 3–10.
- Owen, J.F. and Merrick, J.R. (1994b). Analysis of coastal middens in south-eastern Australia: selectivity of angling and other fishing techniques related to Holocene deposits. *Journal of Archaeological Science* **21**, 11–16.
- Turvey, P. and Merrick, J.R. (1997a). Reproductive biology of the freshwater crayfish, *Euastacus spinifer* (Decapoda: Parastacidae), from the Sydney region, Australia. *Proceedings of the Linnean Society of New South Wales* **118**, 133–157.
- Turvey, P. and Merrick, J.R. (1997b). Population structure of the freshwater crayfish, *Euastacus spinifer* (Decapoda: Parastacidae), from the Sydney region, Australia. *Proceedings of the Linnean Society of New South Wales* **118**, 159–176.
- Turvey, P. and Merrick, J.R. (1997c). Moulting increments and frequency in the freshwater crayfish, *Euastacus spinifer* (Decapoda: Parastacidae), from the Sydney region, Australia. *Proceedings of the Linnean Society of New South Wales* **118**, 189–206.
- Turvey, P. and Merrick, J.R. (1997d). Growth with age in the freshwater crayfish, *Euastacus spinifer* (Decapoda: Parastacidae), from the Sydney region, Australia. *Proceedings of the Linnean Society of New South Wales* **118**, 207–217.
- Versteegen, M. and Lawler, S. (1997). Population genetics of the Murray River crayfish *Euastacus armatus*. *Freshwater Crayfish* **11**, 146–157.